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Letter from Kate Royse

December, Matt stepped down from his role as Director of Informatics at the British Geological Survey and also from his role within OneGeology, to pursue new and exciting opportunities. I am sure that you will all join me in thanking Matt for is for his extensive contributions to OneGeology, and look forward to working with him again, at some point in the near future. Matt has frequently said that he was immensely proud and humbled by our global achievements over Seventeen years, working collaboratively to build a sustainable OneGeology community. We should all be proud of the spirit of friendship, understanding and collaboration that we have demonstrated in order to represent geosciences on a wider international stage, and to deliver the technical standards that underpin our work. In 20 years with the geological survey community Matt has learned that so many shared challenges are best addressed in a common way.

embraced the technical opportunities to further geoscientific knowledge and innovation. Matt has asked that we extend his to thanks to his colleagues and all the friends that he has made, and wishes you all the best for future OneGeology success! As Chief Digital Officer for BGS I have taken over Matt's role as chair of the OneGeology Operational Group This is a huge privilege and I hope that over the next 12 months I will be able to get to know you all, as well as re-affirm BGS' commitment to the exciting and expanding OneGeology initiative. 2019 has been a great year for OneGeology. In February, OneGeology was presented to the IUGS Council meeting and the launch of IUGS's Deep time Digital Earth initiative (DDE) in China. At these meetings we were able to champion the hard work and contribution OneGeology has made with new communities.

Matt will take with him memories of working with inspiring colleagues from across the globe and being thrilled by the way that the OneGeology community

OneGeology will support DDE through sharing our knowledge in data interoperability and the use of standardised data. In March we had the first meeting of our new OneGeology Strategic Steering Group, where the Executive Directors of our Principal Member organisations, came together to discuss common ambitions and strategic direction for OneGeology. We elected the new chair of OneGeology, Tirza van Daalen, Director of the Netherlands Geological Survey, TNO. As an outcome of that meeting, we agreed the first steps towards our new strategy of building Digital Twins.

This newsletter provides updates on developments on the OneGeology portal, documentation and services; as well as reports on the exciting DDE, LOOP, and Digital Twinning pilots that are just starting to produce results; we have included several photographs of the people involved – because it is the people who

make OneGeology what it is.

Finally, I would like to thank Tirza van Daalen and François Robida for their support, and to say that I am looking forward to working with you all in 2020 Prof Kate Royse, chief digital officer, British Geological Survey.

Postponement of IGC36 In Delhi 2-8th March 2020 Our sympathies are with our hard working colleagues in Indian, after the postponement of IGC36, due to the Corona Virus, COVID-19, announced by the Indian Government on Friday 21st February. OneGeology was preparing to welcome you to a special OneGeology session within the Symposium "45.10 Advances in Geoscience Data Sharing and Processing [CGI-IUGS - IAMG - OneGeology - CCOP]" consisting of six papers and two posters and helping to

Author: James Passmore, BGS, co-chair of the TIG

The first Technical Implementation Group (TIG) face-to-face meeting under the new OneGeology structure (open to all technical contacts for OneGeology members, not just the principal members), took place in the Royal Museum for Central Africa (RMCA), Tervuren, Belgium in June 2019, following on from the

111th OGC Technical Meeting at Leuven that was attended by some OneGeology members. RMCA are one of our earliest service providers, providing

chronostratigraphy, faults and lithostratigraphy layers for Rwanda and Burundi at 1:250 000 scale and similar layers for DRC Congo at 1:2 000 000 scale since 2009.

4 4 DATASETS Displayed datasets (4)

DRC Congo 1:2 000 000 Faults

Rwanda and Burundi 1:250 000 Faults

Rwanda and Burundi 1:250 000 Lithostratigraph

Add dataset RMCA-provided data layers on OneGeology. The group decided that one way to improve technical participation was to have virtual meetings of the TIG approximately quarterly, and so the TeleTIG was born. The first TeleTIG occurred on 22 November 2019 and the next is scheduled for 6 February 2020. TIG discussions have centred on improving participation in documentation and user-support activities, especially to non-native English speakers; opening up source code; improvements to the portal; improvements to validation of service metadata, and ways to use standards mechanisms for adding metadata, rather than inventing our own mechanisms. The aim is to encourage data providers to put out rich metadata for their services and data, according to the FAIR principles. We discussed standards in digital twins and how the TIG can be involved to ensure standards are followed in their development. The TIG continues to advocate moving of the technical discussion and any code base development to an open platform, and is currently evaluating GitHub as

Controls the map (zoom, go to home, etc)

be downloaded so it can be used in your own clients or services directly.

GET INFORMATION

X: -131.11083984375 Y: 52.05322265625

CA-BC BCGS 1:250k Mineral occurrences

Members of TIG at RMCA. The TIG was attended (in person or remote) by members from Poland, Belgium, UK, France, Argentina, Canada and Brazil. **Portal and documentation updates** Authors: James Passmore and the **BGS service helpdesk** In the last newsletter, we reported on the soon-to-be released new OneGeology portal client. Since then we've actually had two portal upgrades! The portal now includes a Cesium Globe, for WMS that support CRS:84 projection. The new British Columbia Minerals and Geology service (discussed elsewhere in this newsletter) showcases this globe view. The latest version of the portal now includes some basic user guides for first-time users, showing them where to find services (other than those that are automatically loaded) and how to change the backdrop.

includes an update to the 'Using the OneGeology portal' section, reflecting the quite new user interface. Whilst it is even more intuitive than the previous user interface, users can still benefit from looking at the examples of use. The maps in the OneGeology Kids pages are broken at the moment, but will be back shortly — sorry for any inconvenience. The kids' pages are currently available in Danish, Croatian, Italian, Russian, Slovenian, Turkish and English. If you would like to translate to your own language please let us know; it would be great to have more.

The portal portrayal tools now not only generate an SLD query for both GeoSciML-Lite and ERML-Lite WMS services, but also allow the generated SLD file to

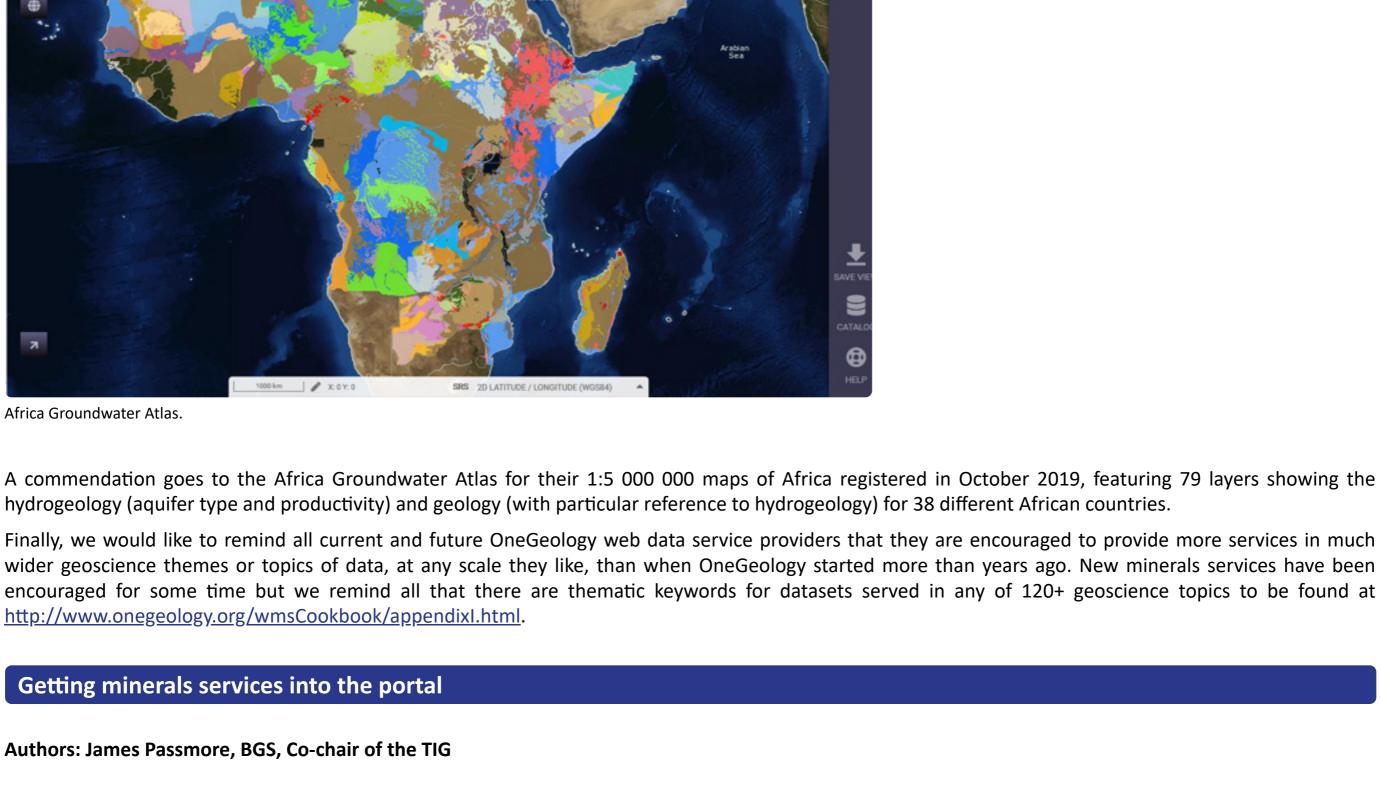
We are still in the process of migrating our cookbook documentation to GitHub for editing and then auto-generating content from there. You will still find documentation on the onegeology.org site, but latest content can now be found at https://onegeology.github.io/documentation/. This new documentation

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HINGTON CA-BC BCGS 1:250k Mineral occurrences on Bing Road backdrop. The mineral occurrence feature depicts a body of rock containing, or thought to contain, ore minerals or potential ore minerals, maintained in MINFILE database by British Columbia Geological Survey. A geographic location depicts the most significant physical reference point to the mineralisation. MINFILE contains geological, location and economic information on over 14 665 metallic, industrial mineral and coal occurrences in British Columbia. The database is used by government, industry and academia for resource management, land-use planning, exploration and research. MINFILE data can be viewed and queried on MapPlace 2. Base map **GET INFORMATION** X: -128.4521484375 Y: 55.92041015625 ()

Base map

SRS 2D LATITUDE / LONGITUDE (WGS84)



Fennoscandian mineral deposits (FODD) database. We now have a second service supplied by British Columbia. The 1:250 000 mineral occurrence service shows data from the MINFILE database containing geological, location and economic information on over 14 665 metallic, industrial mineral and coal occurrences in British Columbia. British Columbia also provide a GeoSciML-Lite 1:250 000 bedrock geology layer.

Portrayal Reset = • The portal now has the capability to re-style ERML-Lite services using the commodity and by mineral occurrence type. The BGS was an invited speaker to the 12th Fennoscandian Exploration and Mining (FEM) conference in Levi, Lapland, in October 2019, where we talked about the importance of open mineral services provided by public sector organisations and our ambitions to use the OneGeology portal to provide access to minerals data. We of course stopped off to speak to Santa Claus to ask for world harmony...

The Loop project is a OneGeology initiative, initiated by Geoscience Australia and funded by Australian Territory, State and Federal Geological Surveys, the Australian Research Council and the MinEx Collaborative Research Centre with the participation of BHP, AngloAmerican and Micromine. The project is led out of Monash University and involves research groups from University of Western Australia, the RING consortium at the Université de Lorraine, Nancy, France, and RWTH Aachen in Germany. In-kind research is also provided by Natural Resources Canada (Geological Survey of Canada), the British Geological Survey

• Current platforms only use a subset of the geological information available, which makes building 3D geological models of poly-deformed terranes very

The open-source Loop platform will address three identified critical technological gaps in 3D geological modelling technologies:

33 attendees from 11 different countries at the first DDE STandards Task Group meeting in Beijing.

Loop — enabling 3D stochastic geological modelling

Author: Laurent Ailleres, Monash University

difficult and non-objective

(BGS) and the BRGM.

resources industry (including water). The platform will be open-source, scalable and applicable to problems from the mine scale to the plate scale, in both data rich and data poor environments. It will serve to solve problems related to urban geology, basins resources exploration and exploitation as well as minerals and scientific exploration in poly-deformed metamorphosed terranes.

(right). These models are based ONLY on geometrical constraints. Figures 1a, 1b and 1c. We have assembled an amazing and complementary team of researchers. Progress has been very satisfactory across the six work packages and is summarise here.

• **Knowledge manager:** an early version of geological knowledge ontology is being tested and evaluated.

offsets, etc. This provides significant and objective constraints for 3D geological modelling.

• Software architecture and infrastructure: the data structure has been defined and work has focused on the development of an interface integrating

(stratigraphic relationship as well as every other type of geological contacts), estimation of apparent unit thicknesses, estimation of apparent fault

• Structural modelling: the structural frame concept, developed to enable modelling of multiple generations of folds has been successfully extended to

Geophysical modelling and integration: in collaboration with the TomoFast community, new algorithms have been developed to utilise geological

• Geological uncertainty mitigation and characterisation: value of information is the focus of this module and the team is working on developing an

A mid-Loop sponsor review meeting will be held in Busselton from 8-15 March 2020, where the team will present the current state of the platform in

uncertainty as an input to constrain geophysical inversions. Methods to recover geological models from inversions have also been developed including

progress from all other work packages (Figure 1a). Most pre-Loop 'research codes' have been rew-ritten as stand-alone, open-source libraries.

• Data pre-processing: the development of 'map2loop' software (Figure 1b) allows the automatic analysis of geological maps in terms of topology

faults and shear zones (Figure 1c). Research is ongoing to provide constraints on intrusion geometries for implementation in Loop.

- ontology for geological and geophysical data. The optimisation of 'new' data acquisition follows a Bayesian approach. The project has created seven new positions, including technical and post-doctoral positions, and we have successfully recruited 11 PhD students working on Lastly, in the past two months, we have run well-attended workshops associated with the AEGC (organised by the ASEG, PESA and the AIG) in Perth, Australia,
- OneGeology website: http://www.onegeology.org OneGeology Brighton Accord: http://www.onegeology.org/what_is/accord.html

Newsletter January 2020 compiled and edited by Virigina Hannah and Lina Hannaford



OneGeology portal: http://portal.onegeology.org

Twitter: @OneGeology | #onegeology

OneGeology administration

Useful links

EUROPEANPLATEOBSERVINGSYSTEM

Dear OneGeology members and supporters, putting together the 2019 annual review for OneGeology, we must start firstly by saying goodbye and thank you to Matt Harrison. In

celebrate the next five years of OneGeology. This Symposium will probably now take place sometime during the new dates for the Conference, now confirmed as, 9 – 14 November 2020. **Technical Implementation Group (TIG)**

this environment. See https://github.com/OneGeology for more details.

rently displayed datasets and allow you

The BGS OneGeology help team like to highlight what they consider to be a new 'Service of the year' award and in this issue this goes to British Columbia Geological Survey for their 1:250 000 mineral occurrences layer using ERML-Lite and their 1:250 000 bedrock geology layer using GeoSciML-Lite registered in April 2019. We've featured this already in the minerals article, but here are two more screenshots, also showcasing some of the different backdrops now offered by the portal.

CA-BC BCGS 1:250k bedrock geology on OpenStreetMap backdrop. The British Columbia Geological Survey offers province-wide integrated digital coverage of bedrock geology, including all details from compilation of field mapping at scales from 1:50 000 to 1:250 000. The BC bedrock geology continuously integrates new regional compilation.

In the last newsletter, we reported that the OneGeology portal had its first EarthResourceML-Lite WMS and simple feature WFS provided by the Finnish Geological Survey (GTK). To recap, the service uses version 2.0 of the ERML-Lite standard that was published in June 2018. ERML-Lite 2.0 is a model and schema for simple map services. It is an abridged version of the full EarthResourceML standard, which can be used to deliver simplified views on mineral occurrences and their commodities, mines, mining activities, mine waste products and processing. The Arctic GTK 1:1 000 000 mineral resources layer from the GTK service shows mineral deposits (mineralOccurrenceView) from the CircumArctic (CA) and

CESIUM ion

1 DATASETS ≡ Select Opacity: 70 鬼 Legeno ▲ Download SLD Statistics

Produced commodity

Filter by mineral occurence type

Chemical compound product

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We'll be giving a similar talk at the 36th International Geological Congress (IGC) in Delhi, in March 2020. In related news, a consortium of Nordic geological survey organisations has put a bid together for a grant from NordForsk under their research and innovation programme on digitalisation of the public sector. The Mineral Resource Service for OneGeology (MiRSO) bid recognises OneGeology as the global platform to provide a gateway to minerals systems data. t aims to make it easier for providers to set up ERML services, to improve the data model to take into consideration social license to operate (SLO) issues and to improve the way minerals information is accessed and shared. **DDE Standards Task Group** Author: Tim Duffy, BGS, OneGeology project leader and head of geoscience interoperability The first Deep-time Digital Earth (DDE) Standards Task Group (STG) face-to-face meeting was held in Beijing on 12–13 January 2020 with support from DDE Kunshan centre. The DDE is the IUGS-recognised BIG Science Program to 'Harmonise global deep-time digital Earth data and share global geoscience knowledge to transform earth science'. DDE has many committees, working groups and a few task groups, and OneGeology was asked to provide the chief scientist for interoperability for this group because OneGeology has led the world in being a standards-*based informatics initiative that promotes interoperable standards in geoscience. Tim Duffy has taken on this role. A very successful two-day meeting took place, which agreed a terms of reference and a short-term work plan to help launch the whole DDE programme at IGC36. The meeting was attended by 33 participants from 11 countries and was chaired by François Robida, the chair of the IUGS-CGI and the BGRM OneGeology lead. Together we ensured that OneGeology was well placed to support and advise the DDE programme in relevant areas. DDE Standard Task Group Face to Face Meeting Deep-time Digital Earth DDE 数据标准国际研讨会 JAN. 12-13 ,2020 Beijing

• The integration with geophysical imaging is limited to the use of interpretative cross-sections or the use of 3D models as reference model for aposteriori inversions that ignore geological data and information Models' uncertainty is extremely high and usually neither quantified nor utilised This enhanced capability is extremely important for the future of subsurface management, including urban geology and our continuously growing sustainable

Fig.1: a) The Loop interface showing the model set up window (left) where data server can be selected as well as an AOI and the model visualisation window (right). b) the map2loop software providing objective estimation of unit thicknesses (left) and fault offsets (right) using strike/dip information and contact geometry.

c) The concept of structural frames applied to a faulted fold series (left) and the development of a duplex

application and/or development of the platform. and the SGTSG (GSA, a specialist group in tectonic and structural geology) in Port Lincoln, South Africa.

For further information, including access to the Loop GitHub, please contact <u>Laurent Ailleres</u>.

technical and hands-on sessions where participants will be able to test the different implementations.

constraints from adjacency relationship (imposed model topology).

- Consortium agreement: http://www.onegeology.org/docs/OneGeology-Consortium-Agreement-2019-Final.pdf OneGeology help: onegeology@bgs.ac.uk General questions: onegeology@bgs.ac.uk C/O British Geological Survey Environmental Science Centre | Nicker Hill | Keyworth | Nottinghamshire NG12 5GG | UK Tel: +44 (0) 115 936 3355 | Fax: +44 (0)8718 954181 | Email: onegeology@bgs.ac.uk | Portal: http://portal.onegeology.org
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